Extended Abstract Prepared for Submission to WISE 2012

Social Advertising: Does Social Influence Work?

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Introduction

Social media platforms are gaining popularity among firms due to their potential ability to use social influence as a more effective way to reach out to individuals. Several studies have demonstrated the usefulness of social media in the promotion of products (Aral and Walker, 2011), diffusion of information goods (Susarala et al. 2010; Yoganarasimhan 2012) and diffusion of prescription drugs (Iyengar et al. 2011). Another possible avenue for using social media is brand promotion. Firms can use a social platform to spread information about their activities and promote their brand. Facebook, one of the most popular social platforms, provides such an opportunity to firms using a feature called sponsored stories. Users can endorse firm related activity promoted as a sponsored story by the firm and make a connection with the firm on the Facebook platform using a ‘Like’. If a user endorses a firm, other users in their social network can see the endorsement. They, in turn, can evaluate the firm related information by clicking the sponsored story and also endorse the brand by using a ‘Like’. An important question is whether the social influence plays a role in brand promotion on a social platform such as Facebook. This is important as firms have to evaluate RoI from these platforms as compared to other media such as television, print, banner and search ads and have to allocate appropriate budgets to promotions through such platforms. While Facebook generates significant revenue from its sponsored stories¹, current market reaction to Facebook’s IPO suggests some skepticism about its long term potential to generate advertising revenue.

The usefulness of a social media platform for brand promotion is not very well understood. The effectiveness of brand promotion would depend on the extent to which users are evaluating brand content endorsed by their social connections and to what extent they are connecting with the brand themselves. In the context of Facebook sponsored stories this can be measured using the click performance as well as the connection performance of a sponsored story. Online banner ads shown on websites have met with limited success as users tend to ignore such ads. Similarly, users on a social platform may not be actively seeking firm or brand related activities when they are using the platform. As a result, they may ignore sponsored stories. However, it is possible that a user may be more willing to click and evaluate a sponsored story as it is endorsed or

‘liked’ by a friend. However, clicking a sponsored story may or may not result in an endorsement. A brand endorsement can be viewed as a confirmation of user tastes. Lewis et al. (2011) show that friends in a social network do not influence each other’s tastes and preferences. Thus, even if a user decides to click on a sponsored story, she may not like it just because her friend liked it.

Tucker (2012) is the only empirical study we are aware of which evaluates the role of social media in brand promotion. Tucker (2012) uses a Facebook ad campaign dataset of a charity firm to show that social ads are more effective than regular ads. She finds that while social influence plays some role, the contribution is primarily due to the ability of ads to target individuals with similar preferences. However, as Tucker (2012) focuses on a non-profit organization her results could be driven by altruism and may not be very representative. Further, Tucker (2012) does not make a distinction between clicks and connections which represent different ways of engaging with a brand on the social platform. Addressing this gap, in this paper we seek to analyze if there is social influence on the click performance of sponsored stories? We also evaluate if there is social influence on connection performance conditional on users clicking a sponsored story?

We investigate these questions by using a unique panel dataset of sponsored stories performance for two different advertisers on Facebook. We addressed endogeneity issues by simultaneously modeling the user decisions, platform decisions and firm’s spending decisions. Our preliminary findings suggest that the social influence may actually hurt the performance of sponsored stories. We find that the click performance decreases with increase in the number of social connections. This suggests that users are less likely to click if more friends are connecting with the brand. We also find that the connection performance conditional on clicking is not affected by the number of connections. This suggests that once users click a sponsored story they are neither less or more likely to connect with the brand.

Model

Click Performance

We do not have individual user specific data for each sponsored story. Instead we have aggregate data such as the number of social impressions, social clicks, connections and cost on a daily basis for each sponsored story posted by our sample firms. This is representative of the dataset available to firms using the Facebook platform for promotions. Social impressions represent the number of times a story was shown using social connections. Higher number of social impressions should result in higher number of clicks as more users are likely to be exposed to the story. Social impressions for a sponsored story also depend on a number of other factors such as the login behavior of individuals, spending budgets of firms as well as the competition among firms to get an impression. Thus, a story may just get more clicks because of these other variables which do not really represent social influence. In order to account for this variance in social impressions, we measure the click performance in terms of the ratio of the number of social clicks and the number of social impressions or the click through rate. This is also the measure used by the platform to evaluate the performance of different firms.
Social influence can be captured by the effect of existing social connections on the click through rate. More connections or ‘likes’ for a brand would represent more users in a social network endorsing the brand. If users can influence others in their social network to evaluate and endorse a brand, then the click through rate should increase with increase in the number of existing social connections. Note that if there is no social influence then the click through rate will not be affected by increase in connections. Also, it is possible that increase in connections may not have an effect on the click performance if users in different social networks are targeted. Click performance of a story can be influenced by unobserved characteristics of the story. For example, a story may be targeted to a group of users who are more likely to click and endorse the story as compared to users for other stories. We account for the impact of these unobservable characteristics using a fixed effects approach for the story. It is also possible that there are external events which can influence the time based performance of a story. In order to account for these effects we also control for the time effects. For a sponsored story $a$ at time $t$, the clickthrough rate can be expressed as

$$CTR_{at} = \beta_0 Connections_{a,t-1} + \delta_a + \delta_t + \epsilon_{at}$$ (1)

where $Connections_{a,t-1}$ is the number of likes that the brand associated with story $a$ has at time $t-1$, $\delta_a$ is the dummy to capture advertiser specific effect and $\delta_t$ to capture time specific effects.

**Connection Performance (CONR)**

On clicking a sponsored story a user may evaluate the sponsored story and elect to endorse the brand using a ‘Like’. As mentioned before, clicks can be driven by several factors not related to social influence and these in turn can influence the social connections. So we define the connection performance as the ratio of the number of connections to the number of clicks or the connection rate. Once again the number of existing social connections would proxy the extent of social influence. For a story $a$ at time $t$, the connection rate can be expressed as

$$CONR_{at} = \theta_0 Connections_{a,t-1} + \delta_a + \delta_t + \epsilon_{at}$$ (2)

**Endogeneity of Existing Social Connections**

Existing social connections represent the extent of social influence. However, existing connections could be correlated with firm specific promotions which are outside the platform. A firm may be willing to spend more on the social platform while running these promotions. This in turn could be driving the click and connection performance. The social platform can also strategically decide to promote only certain firms by showing their stories to the users in response to some external event. In that case, the existing social connections can be correlated with these unobservable time varying attributes which could also be driving the click and connection performance. In order to correct for the resulting bias, we have to account for the firm’s spending choices as well as the platform’s choice to show a firm’s sponsored story. Facebook uses a firm’s bid and its expected click performance to rank it among firms targeting the same group of individuals. A firm can get more impressions and as a result more clicks and connections by submitting higher bids. Thus, existing connections are a
function of firm’s bid. We use the cost per click incurred by the firm as a proxy for a firm’s bid. Connections for a story $a$ at time $t$ can be expressed as

$$\text{Connections}_{at} = \gamma CPC_{a,t} + \delta_a + \epsilon_{at}^\gamma$$  \hspace{1cm} (3)$$

where $CPC_{a,t}$ is the cost per click for story $a$ at time $t$.

A firm’s bid for a story will be correlated with its bids for other stories. If two stories target different groups of individuals then the valuation of these stories will be independent. However, the bids for these stories would be correlated due to common cost factors. As a result we use CPC of other non related stories i.e. stories targeting different set of individuals as an instrument for the CPC of a sponsored story. CPC for a story $a$ at time $t$ can be expressed as

$$CPC_{at} = \alpha_0 \text{Other CPC}_{a,t} + \delta_a + \epsilon_{at}^\alpha$$  \hspace{1cm} (4)$$

These set of equations represent a triangular system. CPC of a story is driven by exogenous CPC of other stories. CPC in turn drives the connections. Users decide to click and or connection based on the existing connections. We solve this triangular system using a 2 SLS approach.

**Data & Results**

Our dataset was provided by a social media marketing firm which manages marketing campaigns for several large firms. It consists of targeting and performance data for sponsored stories promoted by two different advertisers: a well known electronics manufacturer and a cruise travel company for a period of 45 days. Our unit of analysis is a sponsored story which is targeted to a specific user population using a set of keywords and other attributes. Each advertiser runs several sponsored stories. For our analysis, we consider only those ads which get at least 5 connections during the panel period. We evaluate the impact of connections made in the previous period on the click through rate and connection rate in the present period. However, it is possible that connections made in earlier periods may also influence the current performance. In order to account for this we use different time periods to represent existing social connections. Table 1 provides the summary statistics of our final sample for two different advertisers.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Electronics Manufacturer</th>
<th>Cruise Travel Company</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std Dev</td>
</tr>
<tr>
<td>CTR (Social Clicks/Social Impressions)</td>
<td>0.003</td>
<td>0.03</td>
</tr>
<tr>
<td>CONR (Connections / Social Clicks)</td>
<td>0.34</td>
<td>0.42</td>
</tr>
<tr>
<td>Connections (t=t-1)</td>
<td>36.9</td>
<td>127.3</td>
</tr>
</tbody>
</table>
The main results are shown in Table 2 & 3. Table 2 shows that the coefficient of Connections is negative and significant. This suggests that when the number of social
connections increases, CTR decreases after controlling for ad specific effects and the time effects. Increase in connections represents increase in the magnitude of social influence for endorsing a brand. Thus, our results suggest that the click through rate decreases with increase in the social influence. We also find that the existing connections do not affect the connection rate (table 3). This suggests that once users click a story they are not influenced by how many connections exist for the brand associated with the story. Thus, the user response to the social connections is decided at the clicking stage itself. Our results are mostly consistent for different measures of connections.

Discussion

We find that users are less likely to click on sponsored stories when more friends endorse the brand. We also find that users not likely to be affected by others when it comes to endorsements conditional on clicking. Consumers tend to diverge from others while buying products if the products signal their identity (Berger and Chip, 2007). Similar effect could play a role in user decision to evaluate and endorse a brand on Facebook. Endorsement signals a taste preference. The negative effect of existing social connections on clicks suggests that tendency to differentiate themselves from others would prevent users from even evaluating content or brand endorsed by their friends. Thus, our results also reveal the process by which users respond to the social influence. We show that the user decision is influenced by social connections at the clicking stage. However, once they have clicked a sponsored story they are not affected by the social influence.

Our results suggest that firms may not get value from social influence when promoting their brand through platform such as Facebook. However, they may still get value from the ability of the platform to target individuals with similar preferences as suggested by Tucker (2012). In that case a more effective way to target users could be to not reveal the endorsement activity of their social connections. The platform could use the social connections to target appropriate users.

We plan to extend our study in several ways in time for any potential presentation at WISE. First we plan to evaluate if the social connections have a non linear effect on click performance and connection performance. We plan to extend our model to determine how the impact of social connections depends on the individual characteristics determined by the keywords associated with sponsored stories. We plan to evaluate the robustness of our results by considering alternate instruments. Finally, we also plan to evaluate alternate models to test the validity of our results. We plan to have these results ready for potential presentation at WISE.
References


